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Exploring FTIR Absorption Spectra of Agriculturally Applicable Biodegradable Films with Structural Reinforcement

Maria Inês Machado 1, Pamela K.B. Angelo 1, Angela Gonçalves 1, Renan M. Monção 2, Rômulo de Souza 2, Adriana Machado 1

1 Federal University of Cariri

2 Federal University of Piauí

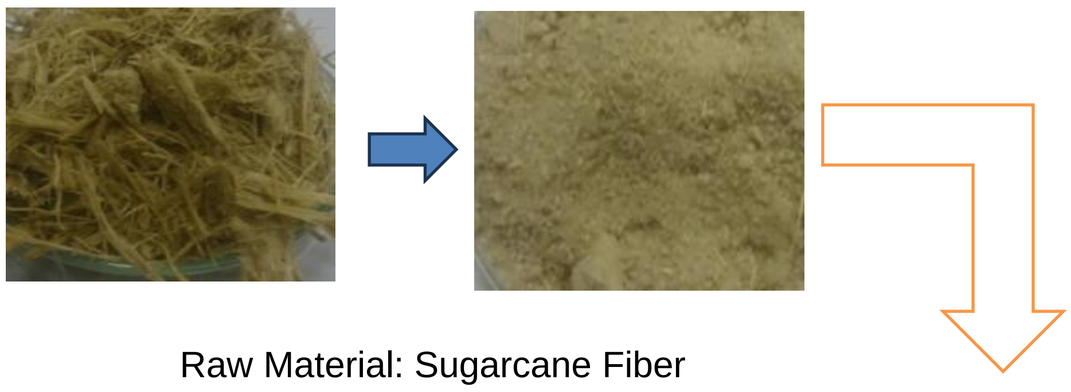
INTRODUCTION & AIM

FTIR (Fourier Transform Infrared Spectroscopy):

- Analysis is crucial in characterizing biodegradable films produced from food waste.
- Helps monitor changes in molecular structure during the degradation process.
- Identifying specific chemical bonds and functional groups helps understand mechanical properties, offering crucial data for evaluating the effective biodegradability of films.

This study aimed to obtain and characterize biodegradable films from agro-industry residues prepared from the casting technique.

METHOD



Raw Material: Sugarcane Fiber

Table 1. Ingredients for the composition of the biodegradable film.

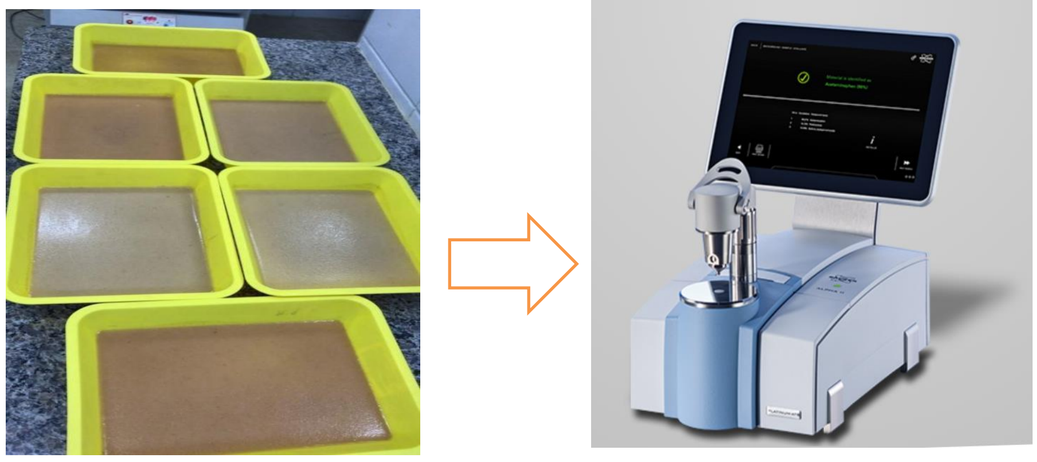
Formulation	Starch (g)	Potassium Sorbate (g)	Glycerol (g)	Sugarcane fiber (g)	Distilled water (mL)
FF	48	3.2	14.4	0	1.60
FCA	48	3.2	14.4	2	1.60

FF: Fiberless Film

FCA: Film with sugarcane fiber

Film Acquisition Technique

Elaboration of biodegradable film: **Casting technique**



FTIR infrared spectroscopy

RESULTS & DISCUSSION

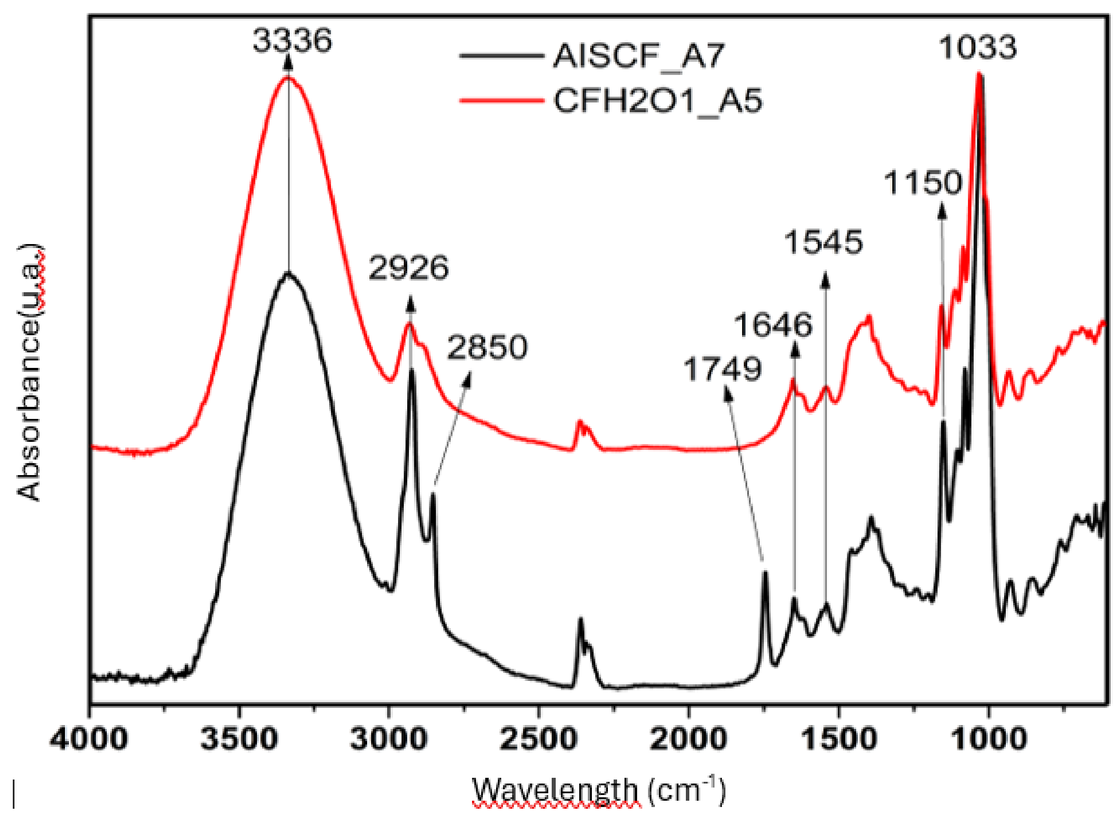


Figure 1: FTIR-absorption spectra of synthesized biodegradable films.

Control film without the addition of fiber
Film with the addition of sugarcane fiber in the structure
Source: Author, 2022.

- The broadband at **3336** cm $^{-1}$ associated with the two samples: stretching of the **OH** groups present in the starch and water molecule.
- The band **2926** cm $^{-1}$ is attributed to the stretching of the **CH** group of the aldehydes present in the polymer matrix.
- band **2850** cm $^{-1}$ is associated with the spectrum in which the fibers were added to the **C=O** absorption of the esters.
- The band of **1646** cm $^{-1}$ to the functional group **C=C.**
- The absorption band of **1033** cm^{-1} associated with the two samples corresponds to the **CO** stretch of the esters.

CONCLUSION

- Therefore, this technique allowed the identification of chemical compositions present in the films, such as polymers and additives.
- By applying FTIR, it is possible to assess the quality, stability, and integrity of films, ensuring that they meet the necessary standards for food packaging.

FUTURE WORK / REFERENCES

JARAMILLO, C. M.; GUTIÉRREZ, T. J.; GOYANES, S.; BERNAL, C.; FAMÁ, L. Biodegradability and plasticizing effect of yerba mate extract on cassava starch edible films. Carbohydrate Polymers, v. 151, p. 150–159, 2016.